

# Clean Coal and the Western Energy Outlook

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# Message

- Buyer of power decides what type of generation gets built
- Consider more than just coal to electricity generation
- Need to close the gap on gasification technology in the West



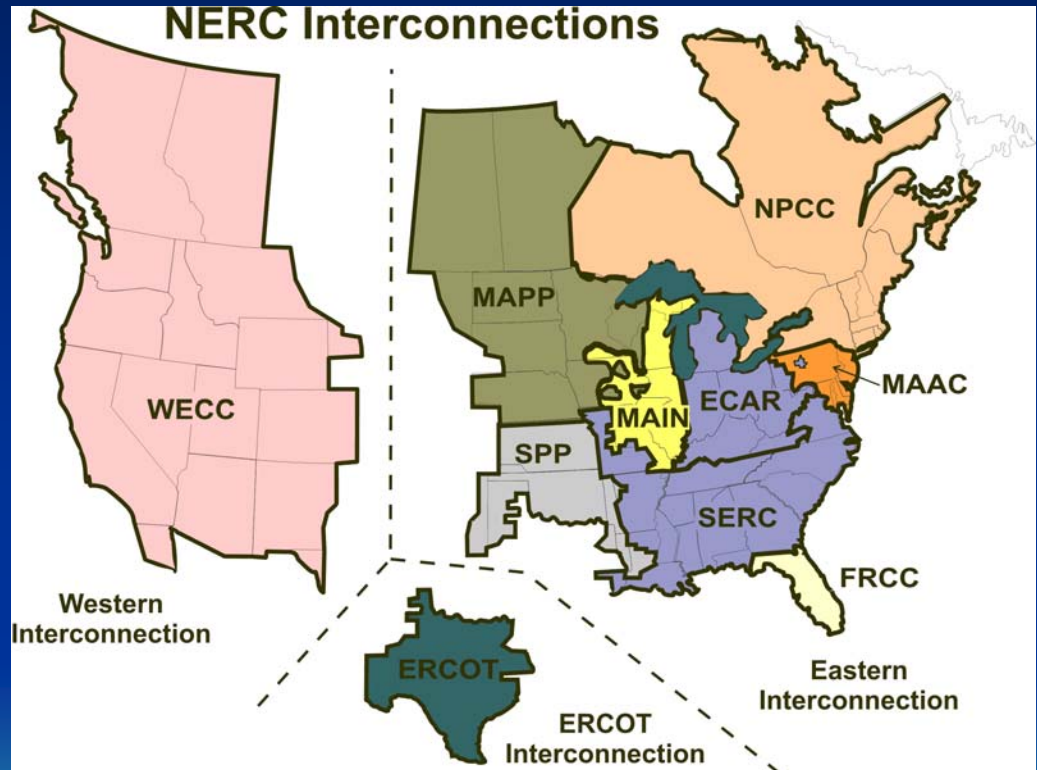
# Outline of Presentation

- Generation mix in the Western Interconnection
  - Existing generation resource mix and how it has changed
- Coal resource base
  - It's big
- Range of clean coal technologies
  - Ability to sequester carbon is the fault line
- Buyer decides
  - Clues on types new generation buyers want
  - LSE treatment of carbon risk
- Consider more than just coal to electricity options
- Closing the gap in gasification technologies

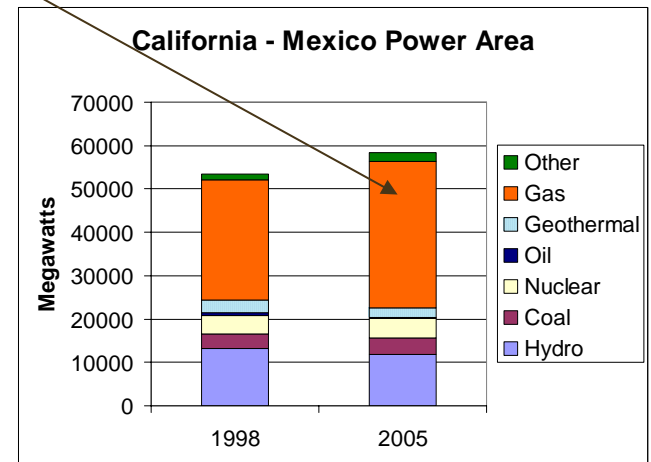
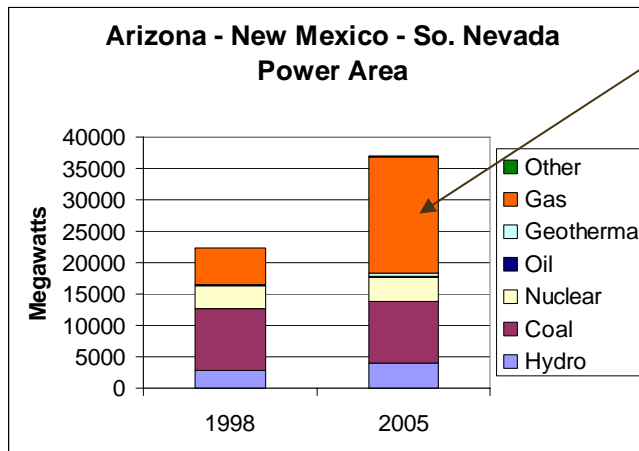
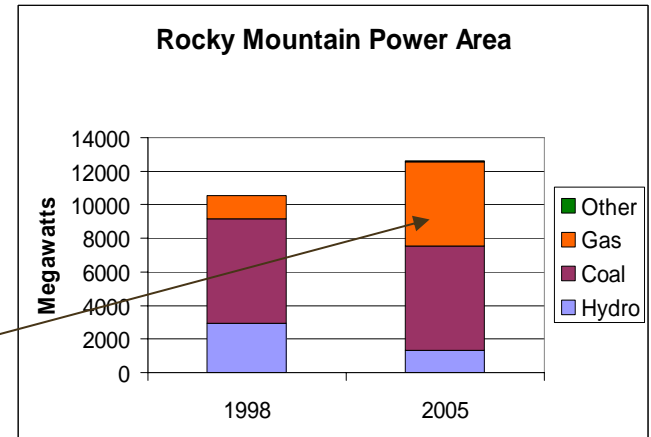
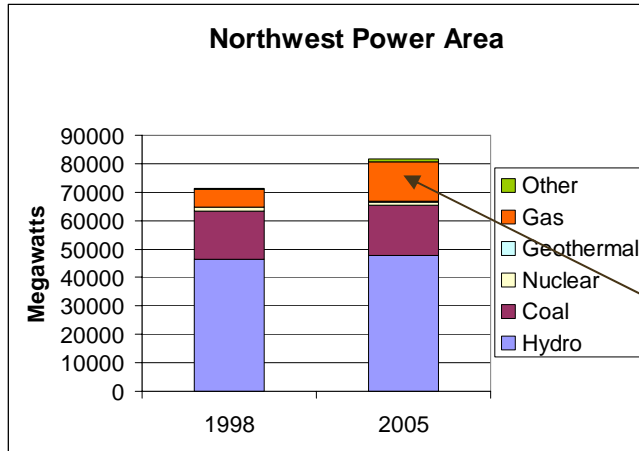


# Generation Mix

- Highly diverse among sub-regions within Western Interconnection
- But diversity declining with recent gas building boom

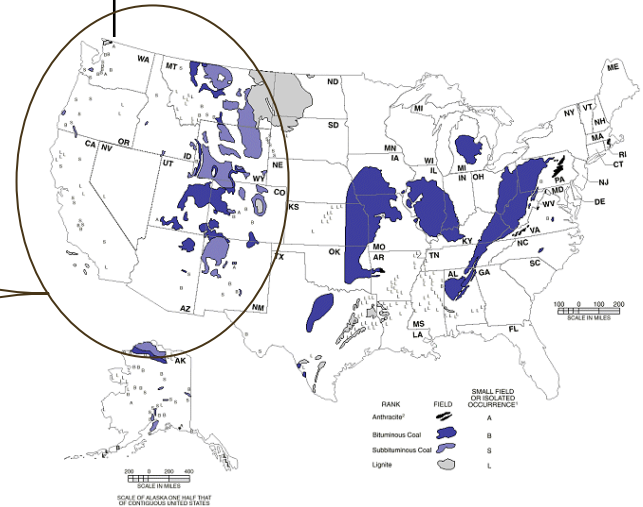
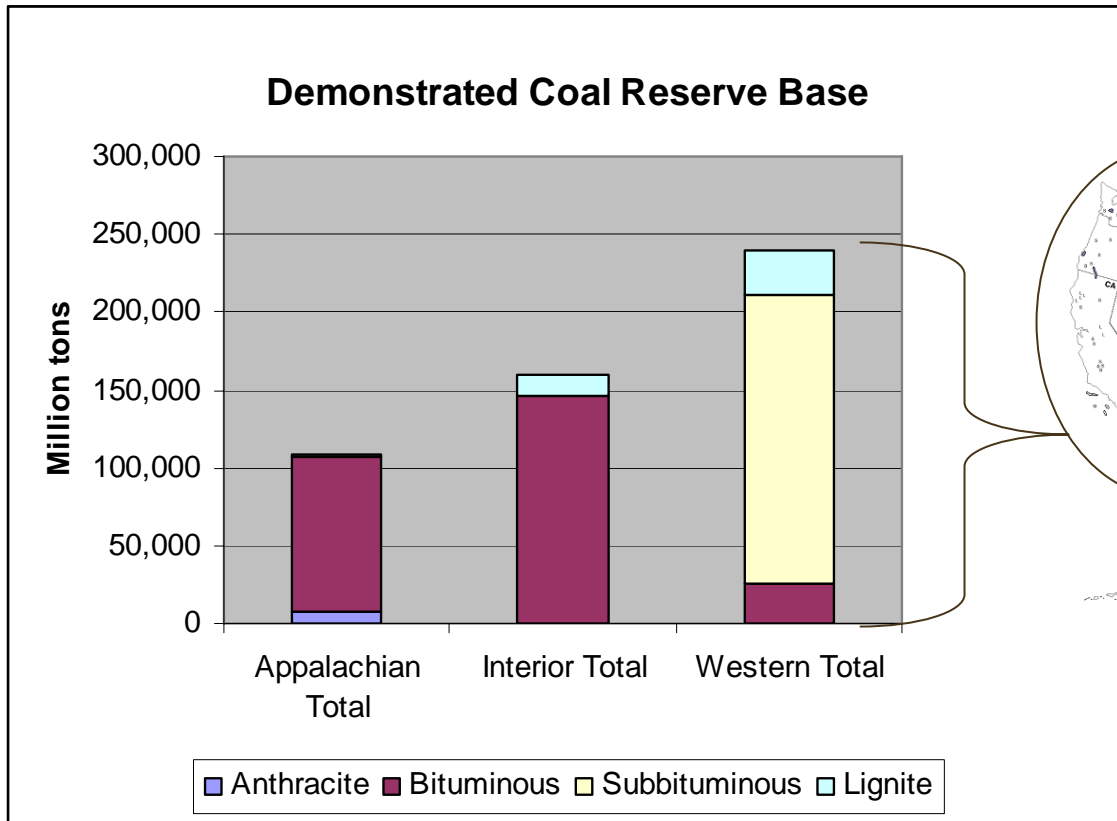


# Last 7 Years It's Growth in Gas-Fired Generation Everywhere



Gas-fired

# Coal Resource Base



# Clean Coal Technologies (from WGA CDEAC process)

- Super-critical PC
- Ultra-critical PC
- Circulating fluidized bed
- IGCC (2<sup>nd</sup> generation)
- IGCC (3<sup>rd</sup> generation)
- IGCC polygen
- Retrofits/repowering

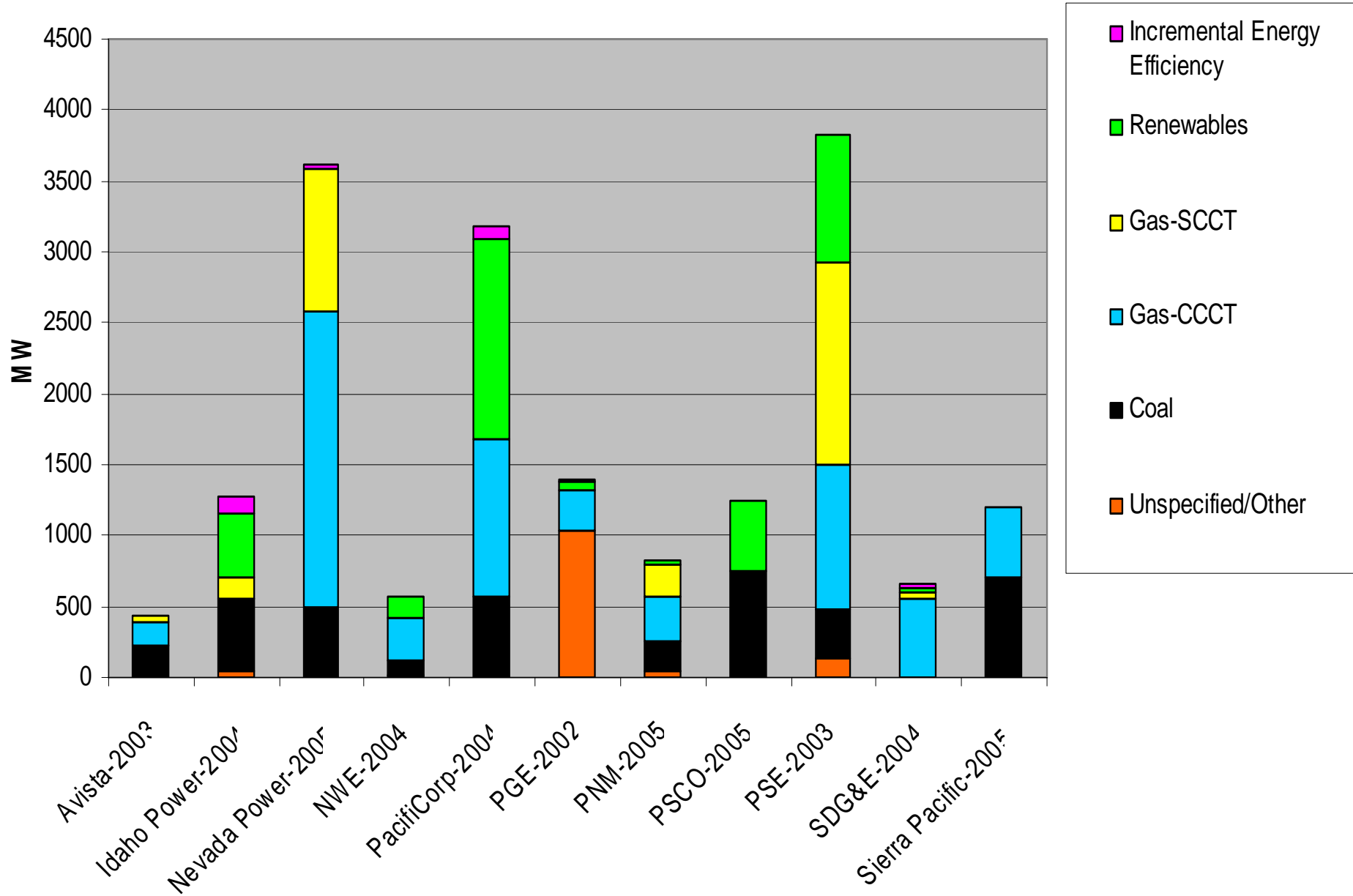


**The buyer decides what  
gets built**



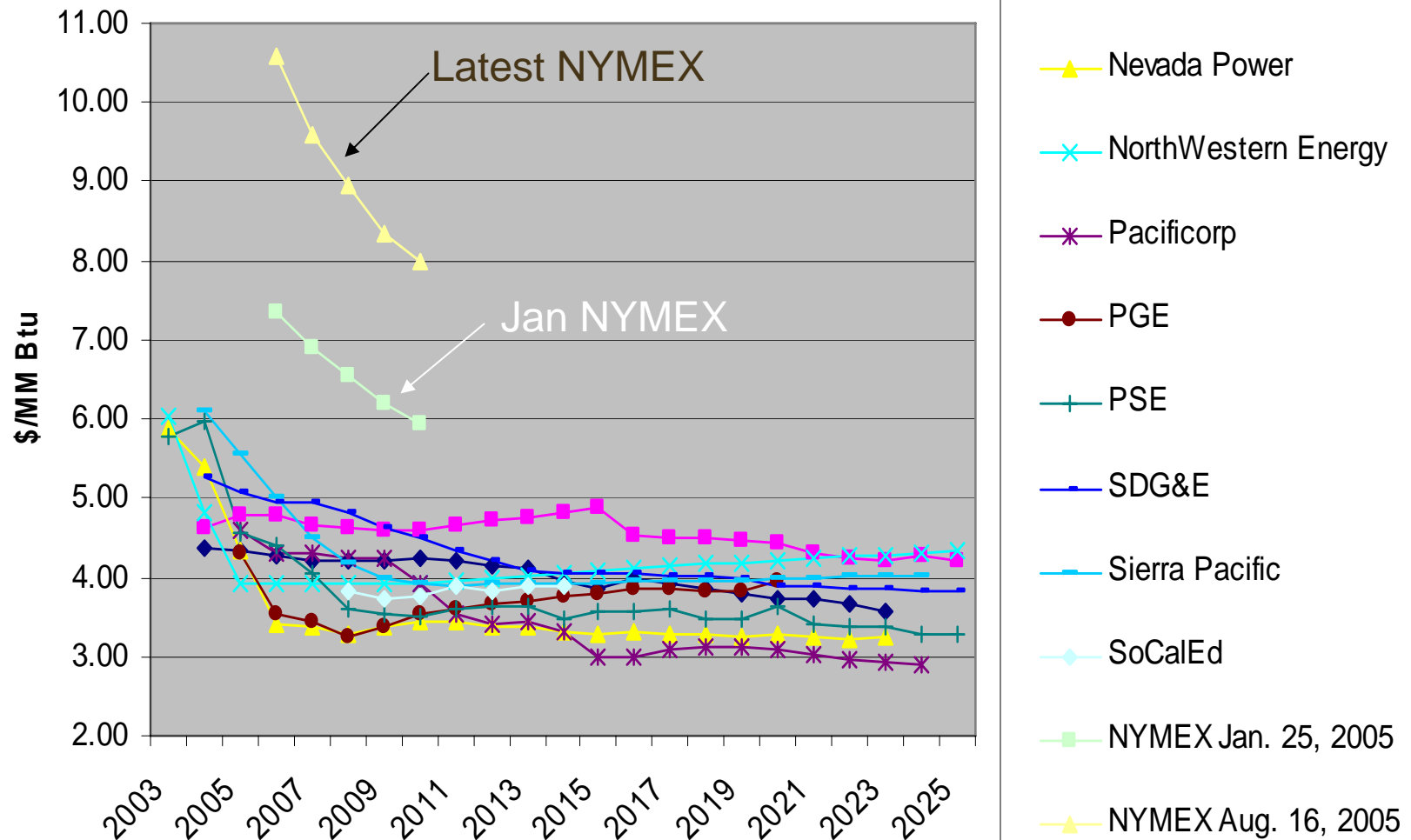


# New Resources In Utility IRPs by 2013

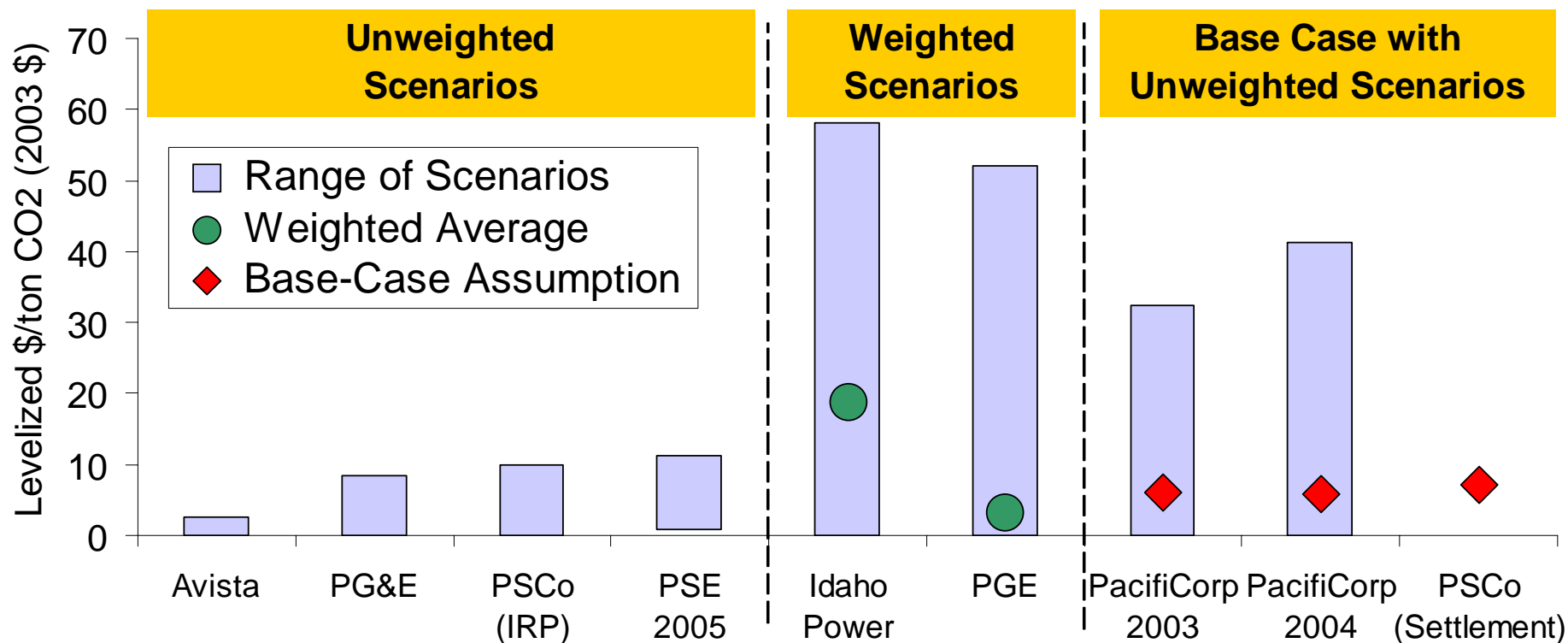


# Gas Price Forecasts:

Henry Hub, 2005\$



# Evaluation of Carbon Risk

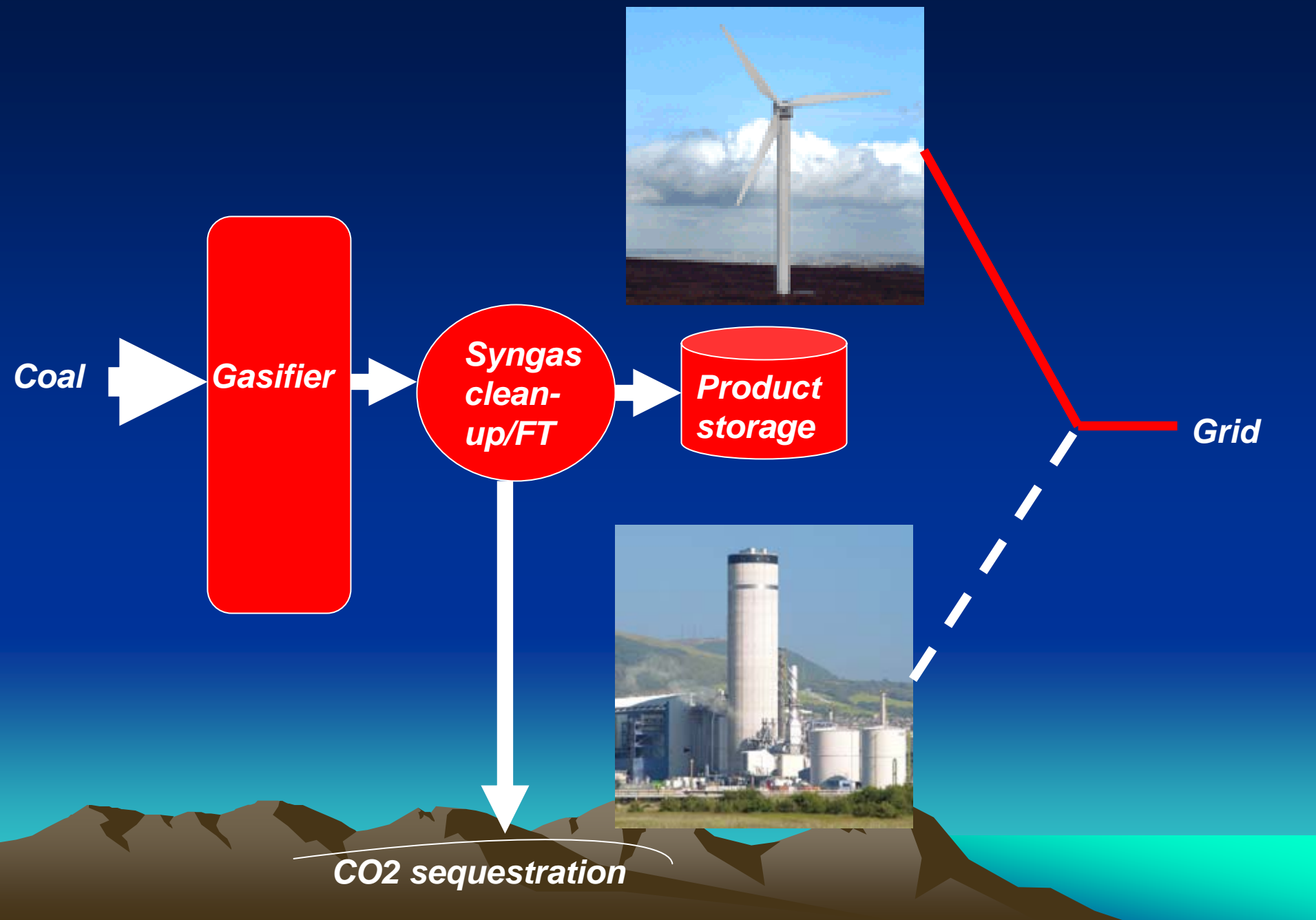


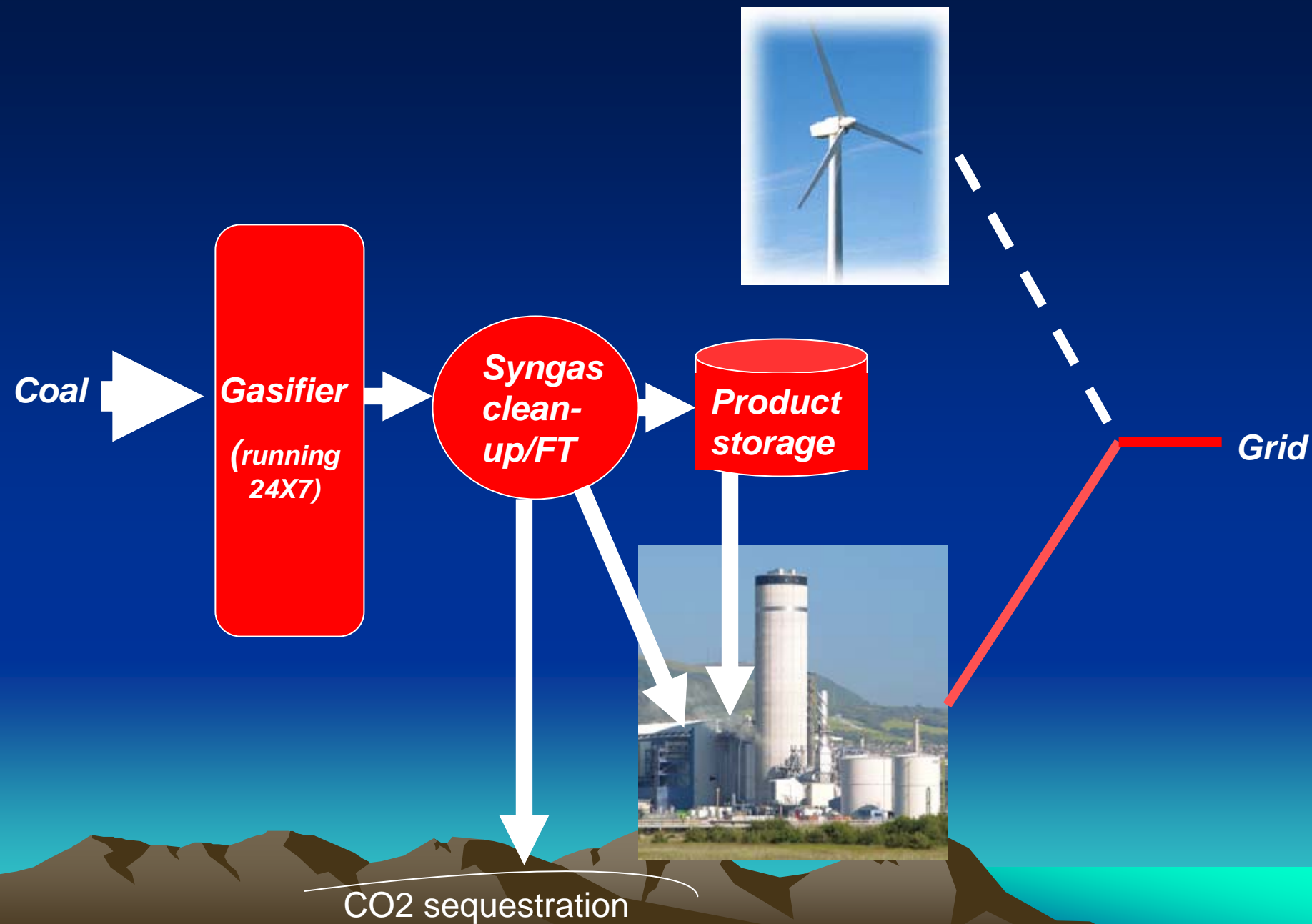
Source: Lawrence Berkeley Laboratory, April 2005

# Consider More Than Just Coal to Electricity Generation

- Polygen
  - Production of liquid fuels and electricity
- Wind/IGCC hybrid
  - Technical and economic feasibility need to be explored
  - Greater utilization of transmission system than wind alone
  - Greener than coal alone







# Closing the Gasification Technology Gap

- Federal R&D on gasification focused on Eastern/Midwestern bituminous coal at low altitude that reflects:
  - 20 years of concerted lobbying
  - Aggressive policies by Appalachian/Midwestern states that were losing coal markets
- Federal energy bill begins to right the imbalance
  - Authorizes IGCC project using western coal at altitudes above 4,000 feet



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